SocialBrowsing: Integrating Social Networks and Web Browsing

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Abstract

In this paper we introduce SocialBrowsing, a Firefox extension that adds social context to the web browsing experience. The extension is paired with services provided by social networking websites, analyzes the page's contents, and adds tooltips and highlighting to indicate when there is relevant social information. We present an overview of the tool and implementation, and outline future steps for analysis.

Keywords

Social Networks, Web Browsing, User Support

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Social networking on the web is a huge phenomenon, with near half a *billion* user accounts among hundreds of websites[4]. These numbers do not just reflect one time participation; several of the top ten most visited sites on the web are social networking sites[1], showing that people are actively returning and participating. In most of these sites, users participate for entertainment, either directly through networking or via the features offered through the site (like blogging).

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However, outside the website there is little benefit from the hours of effort people put in.

We believe the next step for social networking is to use the social information in other applications. We have previously investigated the use of web-based social networks for spam filtering[5]. [5][7] and [10] have all studied the use of trust from social networks in recommender systems. These are good first steps, but there is much more information that social networks can make available. For example, the recommendations produced in the aforementioned systems may be applicable in many other contexts.

In this article, we introduce SocialBrowsing, a Firefox extension that integrates social networking information into the user's browsing experience. As each page loads, the extension analyzes the contents and makes an indication on the page when relevant information is found. We begin by presenting an overview of the proof-of-concept design, then discuss how this work relates to other activities, and outline future directions.

The SocialBrowsing Extension
Firefox Extensions are add-ons to the browser that add and modify functionality. Some popular extensions include Adblock, which uses regular expressions to find and block advertisements from appearing on the page, Forecastfox, which adds a weather report feature to the status bar, and ChatZilla, an integrated IRC client. Extensions can connect to outside services, access the content of the page people are viewing, and even alter the appearance or contents of the page.

Our extension, SocialBrowsing, performs an analysis of the page contents and highlights words or phrases for which it has contextual social information. In this section, we introduce the functionality of the tool and describe the architecture and implementation details.

Configuration
When users install SocialBrowsing, they can configure it to work with any services that provide an interface. We currently have two services available for the extension.

- FilmTrust (http://trust.mindswap.org/FilmTrust/) is a website with a social network and movie rating and review system. Users create a profile, rate movies, and write reviews. They also maintain a list of friends with ratings that indicate how much the user trusts each friend with respect to movies. The social network and movie ratings are used to produce recommended ratings for movies [5]. When a reference to a movie is found on a webpage, FilmTrust provides its recommended rating information to display to the user.

- FOAF spider - FOAF (Friend Of A Friend) is a Semantic Web vocabulary for representing information about people and their relationships. Users can create their own FOAF files, but the vast majority are automatically generated by social networking websites. There are at least twenty different social networks with a combined total of over 15 million users that produce FOAF. We have a crawled part of this network and can use the centralized model to show users how they are connected to the author of or someone mentioned on the page being viewed.

The SocialBrowsing icon in the status bar also contains information about the page as a whole. In this case, it shows a connection in the social network between the user and the blog's author.

Tool tip showing information that the FilmTrust service has identified as related to a link in the text

A icon in the status bar provides to access the extension preferences and configuration options.

figure 1. Illustration of the SocialBrowsing extension's functionality. The blog shown was arbitrarily chosen, so we have obscured the author's name for privacy.

The interface is made up of an icon in the status-bar of the browser, an options panel, and web page modifications that include highlighted terms with tooltips. The icon tells a user if the extension is currently parsing pages by displaying a colored or grayed icon for enabled and disabled parsing respectively. The options panel gives the user the ability to customize the visualization of terms within webpages as well as provide login information for social networks. The login information is necessary for receiving data specific to the user rather than just more general information from a social network.

Interface

With the SocialBrowsing extension installed and configured, users browse the web normally. Figure 1 shows an example of the extension at work. We arbitrarily chose a blog that mentioned a movie to illustrate the results returned from FilmTrust. After the page loads, the extension analyzes the page and communicates with the different services. When results come back, the terms in the page that have available social contextual information are highlighted. Moving the mouse over the highlighted term shows the information that a service returned.

Similarly, SocialBrowsing can provide information about the page as a whole. FOAF files can contain links to the blog of the person being described. If a user is browsing the web and comes across the blog of someone in the FOAF database, the FOAF service will generate a shortest path between the user and the blog author. This information is not connected to any particular item in the page, so it is accessed via a tooltip on the status bar icon.

Architecture and Backend

Many of the algorithms that are executed to generate the contextual information displayed by SocialBrowsing are computationally expensive, as they involve searching large graphs. Furthermore, they all require access to centralized databases, often with private information. As such, the extension is configured to do only minor processing on the client side, and send relevant information to external services that process on the server side.
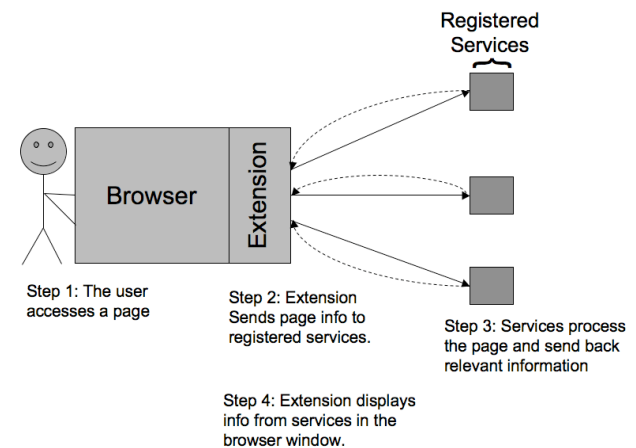
Figure 2 illustrates the architecture.

figure 2. Architecture of the SocialBrowsing Extension.

The backend of the extension is composed of a module for each social network utilized by the SocialBrowsing extension. Each module has a parsing engine to pick out terms relevant to its respective social networks from a webpage. For example, the FilmTrust module

identifies movie titles to query for additional information while the FOAF spider module uses email addresses.

Because the goal with this first version of the extension is to illustrate the concept of integrating social network information with browsing, we have adopted fairly simple methods of analyzing the page content. Currently FilmTrust movies are identified by parsing every link within a webpage using Regular Expressions to find links to movies on the Internet Movie Database (IMDb). FOAF spider terms are identified similarly by looking for *mailto:* email links and querying for data pertinent to the given email address.

The mechanism for querying and receiving data to insert into tooltips is different for each module as well. Each social network that the SocialBrowsing extension gathers data from requires an interface for querying for terms and receiving a response. In the case of FilmTrust and FOAF spider, a server side script is used via HTTP get requests to ask about a particular term. The responses from these services are inserted directly into the tooltips. This response can be either HTML or just plain text to provide rich supplementary content for the user when viewing a webpage.

We eventually envision a web-service based architecture for connecting the extension to services, and a standardized format for services to indicate how the extension should process text in the web page.

Motivation and Related Work
There are several lines of work that relate to this project. In one sense, what we are proposing here is a complement to the study of online communities. Much of the research into online communities (well exemplified in [8]) addresses why users participate and how to motivate further participation. We begin with the premise that people are participating, and study how the information users input can be presented back to them in useful ways.

A project similar to our work is the Flock web browser[3]. Flock is a Mozilla-based browser that it's creators call a "social browser" because of its ability to interact with many social and collaborative websites. For example, Flock integrates the browser's bookmarks with del.icio.us and allows users to do batch uploads and tagging to photo sites like flickr. Our extension is in the same spirit of Flock, but has functionality not present in the browser. Flock is designed more to support interaction with websites while our extension uses data from those sites to add context to browsing.

Previous work has addressed augmenting web pages. Early work, such as [2], introduced navigation aids into web pages. More recently the Haystack project[9] and the follow-on work in [6] present mechanisms for extracting structured data from web-sites and using it to augment the browsing experience. Our work is similar in intent, but differs in approach and subject.

Conclusions and Future Work
The next step for social networks is to take information from them and use it to inform and enhance other activities. Inspired by the vast number of social network users, we created SocialBrowsing, a Firefox extension that integrates information from social networks into the user's browsing experience.

We have completed the first proof of concept implementation, and plan to begin evaluation through experiments and study of user behavior with the tool installed.

Acknowledgements

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